

REMARKS

Claims 1 and 5-10 are rejected; and claims 2-4 are objected to as being allowable if rewritten in independent form.

Review and reconsideration on the merits are requested.

In response to the rejection under 35 U.S.C. § 112, second paragraph, claim 6 has been amended as suggested by the Examiner. Withdrawal is respectfully requested.

Claims 1 and 5-10 were rejected under 35 U.S.C. § 103(a) as being unpatentable over EP 0 937 979 A2 (EP '979) in view of JP 2001-141696 (JP '696) with or without U.S. Patent No. 5,340,462 to Suzuki.

Applicants traverse, and respectfully request the Examiner to reconsider in view of the amendment to the claims and the following remarks.

The present invention provides a NO_x measurement apparatus including first and second oxygen pump cells, where a voltage higher than a measurement voltage is applied to the second pump cell during activation, and the apparatus further includes clamp means for limiting the voltage applied to and thereby protecting the second pump cell.

EP '979 discloses a limiter circuit 59 including clamp diodes which serves to limit the voltage applied to the first pump cell. JP '696 discloses applying a higher voltage V₂ to the second pump cell during activation, whereas Suzuki discloses bi-directional voltage limiter 26 for limiting the range of voltage applied to oxygen pump device 11a to within a certain range (about ± 1.8 volts).

The Examiner concluded that:

One possessing ordinary skill in the art would have been motivated to utilize the diodes of EP '979 for the now modified second oxygen pump cell to prevent the application of voltage during the warm-up period that would be so excessive as to be blacken the second oxygen pump cell.

However, contrary to the Examiner's suggestion, there is nothing in the Abstract of JP '696 or the cited prior art which recognizes the problem of applying too high of a voltage to the second pump cell during the activation period, and therefore the prior art also does not suggest the use of clamp means to prevent excessive application of voltage during the warm-up period. The fact that JP '696 teaches application of a voltage in excess of normal operating voltages only suggests a second, higher voltage generating source but does not recognize the above-described problem and does not suggest Applicants' solution thereof (clamp means).

In particular, the present invention allows for use of a car battery (12V source) as a power source of the voltage generation means, which high voltage would ordinarily damage the second oxygen pump cell if directly applied thereto.

To clearly make this distinction, claim 1 has been amended to recite that the voltage supplied from the power source is at a level which would damage the second oxygen pump cell if applied directly thereto, and that the voltage applied across the second oxygen pump cell during measurement is at a level that does not damage the second oxygen pump cell but less than the voltage supplied from the power source.

Suzuki also does not teach limiting the voltage applied to the second pump cell during the activation. Additionally, the series of diodes 26 of Suzuki does not limit the current applied to the pumping cell as suggested by the Examiner. Rather, the by-directional voltage limiter 26 of

Suzuki limits the voltage applied to the oxygen pump device 11a to within ± 1.8 volts, different from limiting the current applied to the pumping cell.

The specification bridging pages 17-18 has been amended to correctly refer to the diode 22d of Fig. 3(B). Also, the Abstract has been amended to correct a typographical error.

Claim 2 has been rewritten in independent form as new claim 11 (i.e., the combination of original claim 1 and allowable claim 2).

For the above reasons, it is respectfully submitted that the amended claims patentably distinguish over the applied prior art, and withdrawal of the foregoing rejection is respectfully requested.

Withdrawal of all rejections and allowance of claims 1-11 is earnestly solicited.

In the event that the Examiner believes that it may be helpful to advance the prosecution of this application, the Examiner is invited to contact the undersigned at the local Washington, D.C. telephone number indicated below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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